

**Abstract**

A system and method can detect and track targets in a scene of interest. Interframe differencing can be performed on sequential pairs of images of the scene and a Bayesian model analyzer can obtain an interframe difference density function. The interframe difference density function can be partitioned into static and mobile regimes to provide an objective function. A tracking module can construct a level set and geodesic active contours can be determined for the targets. An adaptive control can apply a spatial transformation and level set perturbation to the geodesic contours to oscillate the contours such that the level set can drop to a lower energy level. The expanded contour can be fed back for use in processing subsequent interframe differences. Target motion analysis data, such as bearing and bearing rate data, can be extracted from the geodesic active contours by applying geometric based transformations on the curve's coordinates.